A.2.11 SWMU 19

Description

SWMU 19 was identified based on the indicated presence of TEL burials on the Refinery Leaded Burial Map. SWMU 19 is depicted on Figure A.2.9 and consists of a suspected 20-foot by 20-foot TEL sludge burial located to the west of Tank 326 in the North Field.

As summarized on Table A.2.9, 30 borings, 20 soil samples and one groundwater sample have been used to characterize this SWMU. Relevant data from the OWSS Investigations (MY2 and NF4) are also shown on Table A.2.9 for delineation purposes.

A total of 24 borings were installed during the 1st-Phase RFI, as summarized on Table A.2.9. Seven fill material samples were collected from the 1st-Phase RFI borings and analyzed for Skinner's List VOCs and SVOCs, lead and TEL. One sample (SB0039) was also analyzed for Skinner's List metals.

During the full RFI, 13 soil samples were collected from five borings to further characterize SWMU 19. Of these, three samples were analyzed for BTEX and PAHs, ten samples were analyzed for TCL VOCs and SVOCs, four samples were analyzed for TAL metals, and six samples were analyzed for lead and TOL. One sample (S0775C4) was also analyzed for SPLP lead and physical characteristics.[1]

Soils

As depicted on Figure A.2.9, SWMU 19 is located west of Tank 326. Stained soils within the fill unit were observed throughout most of SWMU 19, with frequent observations of flyash and catalyst beads. The following table summarizes the number of samples where soil delineation criteria were exceeded within SWMU 19:

Constituents of Concern	Surface Soils (0 to 2 ft) (4 Samples)	Fill Material (>2 ft) (12 Samples)	Native Soils (4 Samples)	Totals (20 Samples)
Benzene	0/4	1/12	0/4	1/20
Other VOCs	0/4	2/12	0/4	2/20
Benzo(a)pyrene	1/4	6/12	0/4	7/20
Other SVOCs	1/4	8/12	0/4	9/20
Lead	0/2	0/11	0/2	0/15
Other TAL Metals[a]	0/1	1/3	0/1	1/5
TOL/TEL	0/2	1/9	0/2	1/13

[a]Totals do not include naturally-occurring metal compounds in excess of the delineation criteria (Al, Ca, Fe, Mg, Mn, K and Na).

[1]Physical characteristics specified in Appendix A, Task IV of Module III of the HWSA Permit included saturated and unsaturated permeability tests, moisture content, relative permeability, bulk density, porosity, soil sorptive capacity, CEC, TOC, pH, Eh and grain size distribution.

Surface Soils (0 to 2 feet bgs)

Staining and/or elevated headspace readings, and catalyst beads were observed in the surface soils at several of the SMWU 19 borings. However, only one surface soil sample (S0774A4) contained benzo(a)pyrene (0.76 mg/kg) and several other SVOCs above the applicable soil delineation criteria. Neither VOCs, metals (including lead), nor TOL/TEL were detected in surface soils above the soil delineation criteria.

Fill Materials (>2 feet bgs)

The lithologic descriptions on the boring logs indicate that visual evidence of petroleum-related impacts (e.g., indication of petroleum odor, staining, etc.) was frequently noted. Flyash material and/or catalyst beads were observed in each boring except SB0110 and U019015. The thickness of the fill layer ranges from approximately 8.5 feet (U019016) to 13 feet (S1384) at SWMU 19.

As shown on the table above, benzo(a)pyrene and other SVOCs were detected at the highest frequency within the fill unit soil samples from SWMU 19, although benzene (200 mg/kg) and other VOCS were detected in one subsurface fill sample (S1384B4). Only one metal (arsenic at 33 mg/kg) and TEL (2.87 mg/kg) were detected in excess of the soil delineation criteria at one location each (S1384 and SB0210, respectively). Arsenic (33 mg/kg) is well within the normal range for soils, particularly glauconitic soils in the Coastal Plain (Saunders, 2003). Similar to other TEL burial areas (e.g., SWMA 1), the arsenic exceedance does not correlate with the lead exceedance at SWMU 19.

Native Material

A clay and peat (meadow mat) layer underlies the fill material in this part of the Refinery at depths ranging from six to 13 feet bgs. Black staining was observed within the native material at SB0208, but no other native soil samples indicated staining or elevated PID responses. Additionally, no COCs were detected above applicable soil delineation criteria within the native soil at SWMU 19. Therefore, the site-related soil impacts have been delineated vertically.

As discussed further in Section 6 of the RFI Report, lateral delineation of selected COCs has been completed on a site-wide basis for each Yard. The delineation of these COCs is depicted graphically on the figures provided in Section 6.

Groundwater

A proposed monitoring well at this SWMU could not be installed because this area is inaccessible for a monitoring well drill rig. Therefore, no monitoring wells are located near this SWMU. However, benzene (16 µg/L), benzo(a)pyrene (78 µg/L) and several other PAHs, and lead (201 µg/L) were detected above groundwater delineation criteria in the hydropunch sample collected in 1997. Benzene and/or lead were also detected above the groundwater delineation criteria in hydropunch samples collected in 1999 as part of

the Phase II OWSS Investigation near SWMU 19. However, the lead detected in these hydropunch samples is not necessarily considered to be representative of actual groundwater conditions at this SWMU. A comparison of data between monitoring well samples and hydropunch samples at other locations where both types of data are available shows that there is no correlation between concentrations of metals and SVOCs detected in monitoring wells as compared to hydropunch samples. Therefore, the presence of lead in hydropunch samples may be because this compound is readily sorbed to soil. Further discussion of groundwater impacts can be found in Section 8 of the RFI Report.

Summary

Several COCs, including but not limited to, benzene, benzo(a)pyrene and TEL/TOL are present in soils at concentrations above their respective soil delineation criteria at SWMU 19. The impacts are found almost entirely within the fill layer (which also exhibits widespread evidence of stained soils). However, it does not appear that this area was used as a TEL burial area based on the fact that TEL/TOL (2.87 mg/kg) was detected slightly above the soil delineation criteria (2 mg/kg) in only one of the 13 soil samples that were analyzed for TEL, and lead was not detected above the soil delineation criteria in any of the 17 soil samples that were analyzed for lead. Nonetheless, impacted soils from the fill unit within SWMU 19 will be included in the CMS for further evaluation for direct contact concerns. Potential impacts to groundwater will also be evaluated further as part of the site-wide groundwater evaluation in the CMS.